

WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

a silicon substrate;

a SiGe layer formed on the silicon substrate and having an element isolation groove formed in the surface of the SiGe layer, which defines an active region;

a silicon layer formed on the side wall of the element isolation groove and the SiGe layer in the active layer; and

an element isolation insulation film buried in the element isolation groove with the silicon layer formed in.

2. A semiconductor device according to claim 1, further comprising:

a source diffused layer and a drain diffused layer formed in the active region; and

a gate electrode formed on the silicon layer between the source diffused layer and the drain diffused layer with a gate insulation film formed between the silicon layer and the gate electrode.

3. A semiconductor device according to claim 1, wherein

the active region is divided by the element isolation groove in a collector formed region and a base emitter formed region,

the semiconductor device further comprising:

a first conduction type-collector region formed in the SiGe layer and the silicon layer in the collector formed region;

a second conduction type-base region formed in the silicon layer in the base emitter formed region; and

a first conduction type-emitter electrode contact region formed in the silicon layer in the base emitter formed region.

4. A semiconductor device according to claim 1, further comprising:

an insulation film formed on the silicon layer on the side wall of the element isolation groove.

5. A semiconductor device comprising:

a silicon substrate having an element isolation groove defining an active region formed in the surface;

a SiGe layer formed on the side wall of the element isolation groove and the active region in the silicon substrate;

a silicon layer formed on the SiGe layer; and

an element isolation insulation film buried in the element isolation groove with the silicon layer formed in.

6. A semiconductor device according to claim 5, further comprising:

a source diffused layer and a drain diffused layer formed in the active region; and

a gate electrode formed on the silicon layer between the source diffused layer and the drain diffused layer with a gate insulation film formed between the silicon layer and the gate electrode.

7. A semiconductor device according to claim 5, wherein

the active region is divided by the element isolation groove in a collector formed region and a base emitter formed region,

the semiconductor device further comprising:

a first conduction type-collector region formed in the SiGe layer and the silicon layer in the collector formed region;

a second conduction type-base region formed in the SiGe layer and the silicon layer in the base emitter formed region; and

a first conduction type-emitter electrode contact region formed in the silicon layer in the base emitter formed region.

8. A semiconductor device according to claim 5, wherein

the silicon layer is an electron supplying layer for supplying electrons as carriers to the SiGe layer,

the semiconductor device further comprising:

a source diffused layer and a drain diffused layer formed in the active region; and

a gate electrode formed on the silicon layer between the source diffused layer and the drain diffused layer.

9. A semiconductor device according to claim 5, further comprising:

an insulation film formed on the silicon layer on the side wall of the element isolation groove.

10. A semiconductor device according to claim 4, wherein

the insulation film is a SiN film or a SiON film.

11. A method for fabricating a semiconductor device comprising the steps of:

forming a SiGe layer on a silicon substrate;

forming in the SiGe layer an element isolation groove for defining an active region;

forming a silicon layer on the side wall of the element isolation groove and the SiGe layer in the active region; and

burying an element isolation insulation film in the element isolation groove with the silicon layer formed in.

12. A method for fabricating a semiconductor device according to claim 11, further comprising, prior to the step of burying the element isolation insulation film in the element isolation groove, the step of:

forming an insulation film on the silicon layer.

13. A method for fabricating a semiconductor device according to claim 12, wherein

in the step of forming the insulation film, a SiN film is formed as the insulation film.

14. A method for fabricating a semiconductor device according to claim 13, further comprising, prior to the step of forming the insulation film, the step of:

oxidizing the silicon layer to form a silicon oxide film on the surface of the silicon layer.

15. A method for fabricating a semiconductor device according to claim 12, wherein

in the step of forming the insulation film, the silicon layer is oxidized and nitrified to form a SiON film as the insulation film.

16. A method for fabricating a semiconductor device according to claim 11, wherein

the step of forming the element isolation groove in the SiGe layer comprises the steps of: forming a silicon layer on the SiGe layer; oxidizing the silicon layer; forming a SiN film on the oxidized silicon layer; and forming the element isolation groove in the SiGe layer by etching through the SiN film.

17. A method for fabricating a semiconductor device comprising the steps of:

forming in a silicon substrate an element isolation groove for defining an active region;

forming a SiGe layer on the side wall of the element isolation groove and the active region in the silicon substrate;

forming a silicon layer on the SiGe layer; and

burying an element isolation insulation film in the element isolation groove with the silicon layer formed in.

18. A method for fabricating a semiconductor device according to claim 17, further comprising, prior to the step of burying the element isolation film in the element isolation grooves, the step of:

forming an insulation film on the silicon layer.

19. A method for fabricating a semiconductor device according to claim 18, wherein,

in the step of forming the insulation film, a SiN film is formed as the insulation film.

20. A method for fabricating a semiconductor device according to claim 19, further comprising, prior to the step of forming the insulation film, the step of:

oxidizing the silicon layer to form a silicon oxide film on the surface of the silicon layer.

21. A method for fabricating a semiconductor device according to claim 18, wherein

in the step of forming the insulation film, the silicon layer is oxidized and nitrified to form a SiON film as the insulation film.